2006

Water Quality Results from Indian Head River, Hanover, MA

SOUTH SHORE VOTECH SCIENCE CLUB!

Science club

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Indian Head River, Hanover, MA

http://www.google.com/maps?ie=UTF-8&oe=UTF-8&hl=en&tab=wl&q=

Objectives

Our objectives were to better understand our surroundings environments and to start a study at the Indian Head River system in Hanover that can be monitored throughout the housing development process in the area.

What we did

- We measured and mapped out the area in and around the stream using “profile equipment”
- We also tested the Nitrate (N-NO3) and Phosphate (SPR) levels using the Sigma 900
- We tested dissolved oxygen, specific conductivity “ion” using the hydro lab probe.
- Lastly, we collected information regarding PH and temperature.

Riparian Zone

Consists of vegetated material adjacent to river channels. They are natural barriers which prevent agricultural pollution to enter water. Examples are nitrogen and phosphate.

Procedure

- Stream profile:
- Measuring stream

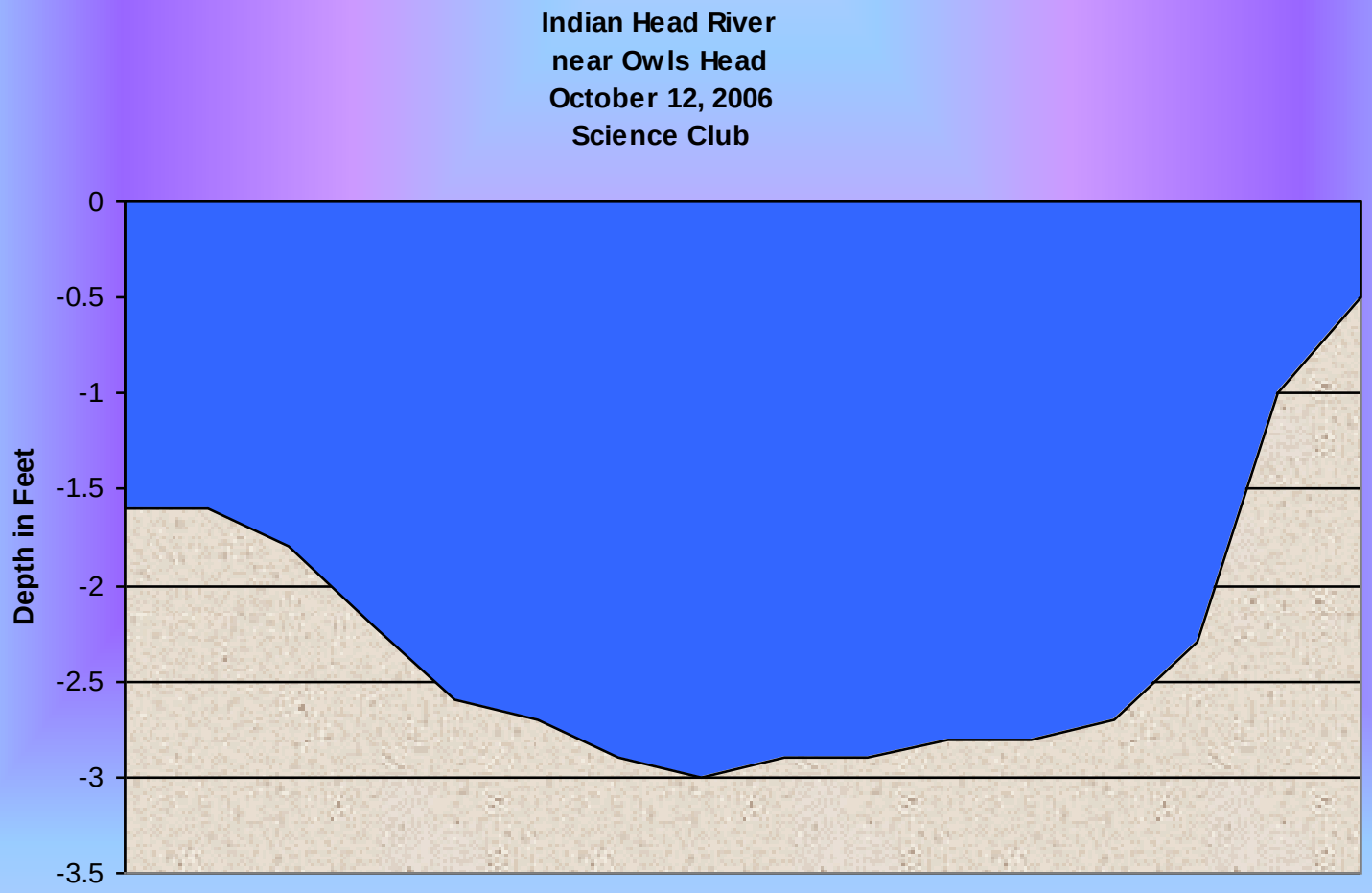
Hydrology: To determine how many liters of water and the amount of nitrogen and phosphate traveled down stream over time.

Average depth and width of the river area.

Equipment used

- Flow meter: designed for measuring the velocity in a liquid using a magnetic field. This is measured in feet per second.
- Depth gauge rod: used to measure the depth of the river. It also holds the flow meter in place.
- Tape measure: to measure width of river.

AT THE RIVER



The width of the River was 32 Feet.

Chemistry

- Sigma
- Set out and started up the sigma 900 (r2d2 unit)
- Collected samples every 2 hours
- Filtered
- Brought samples to Bridgewater State College.
- Calculated amount of pollution flowing down river.

- Hydro lab
- Measured levels of
- Phosphate
- Nitrate levels

Calculations

- Discharge
- Avg. river velocity x Avg. cross-sectional area = Discharge (l/s)
- Load
- Discharge x Concentration of phosphate or nitrogen = Load (g/day)

Chemistry

phosphate: salts, fertilizers, added to water. Is a pollutant if in large amounts.

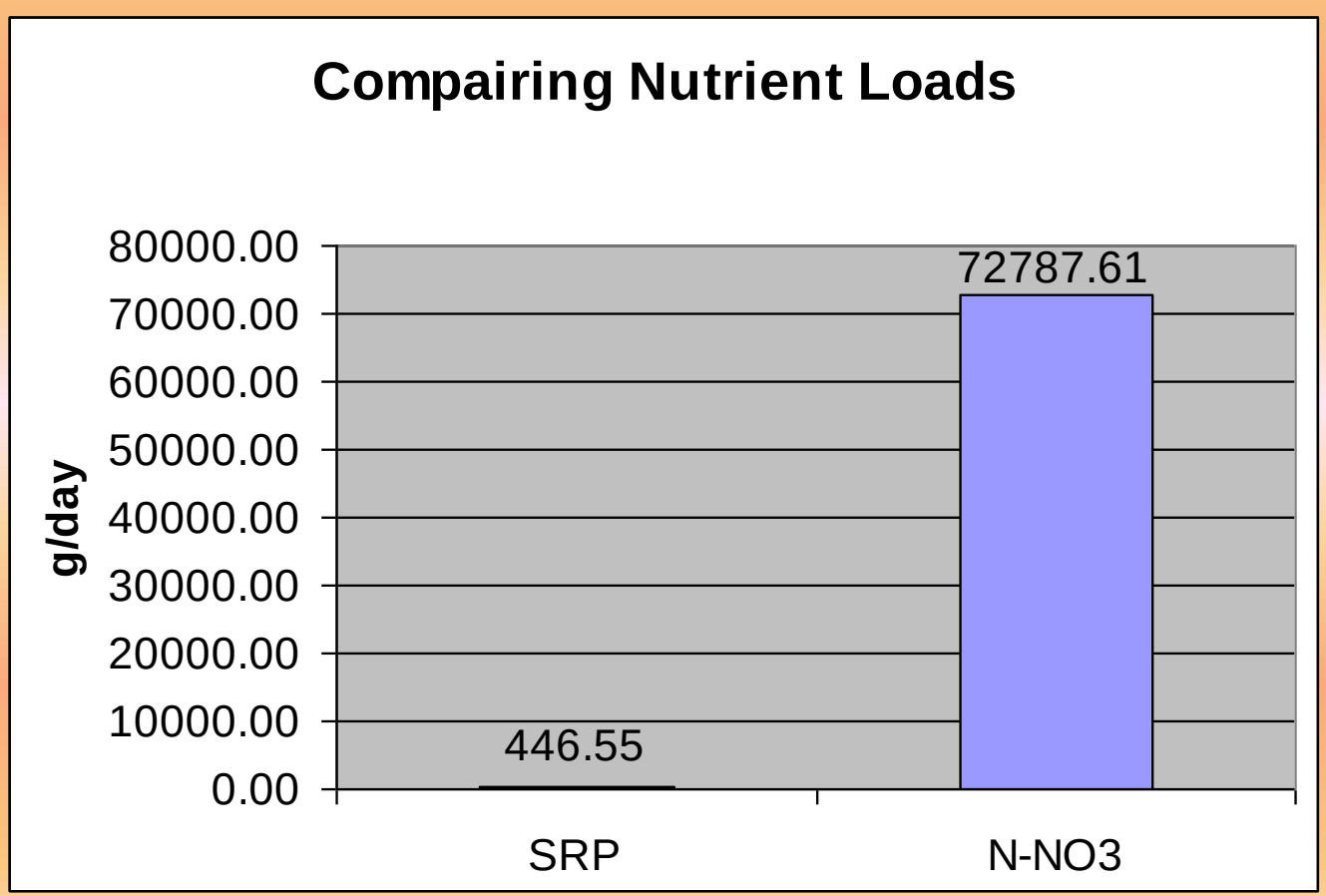
Nitrate levels: nitrates occurs naturally. Comes from fertilizers, sewage, dead vegetation and manure.

pH: measurement of how acidic or alkalinity. On a scale from 0-14, water being 7. Measures # of H+ (hydrogen ions)

Temperature: measurement of kinetic energy.

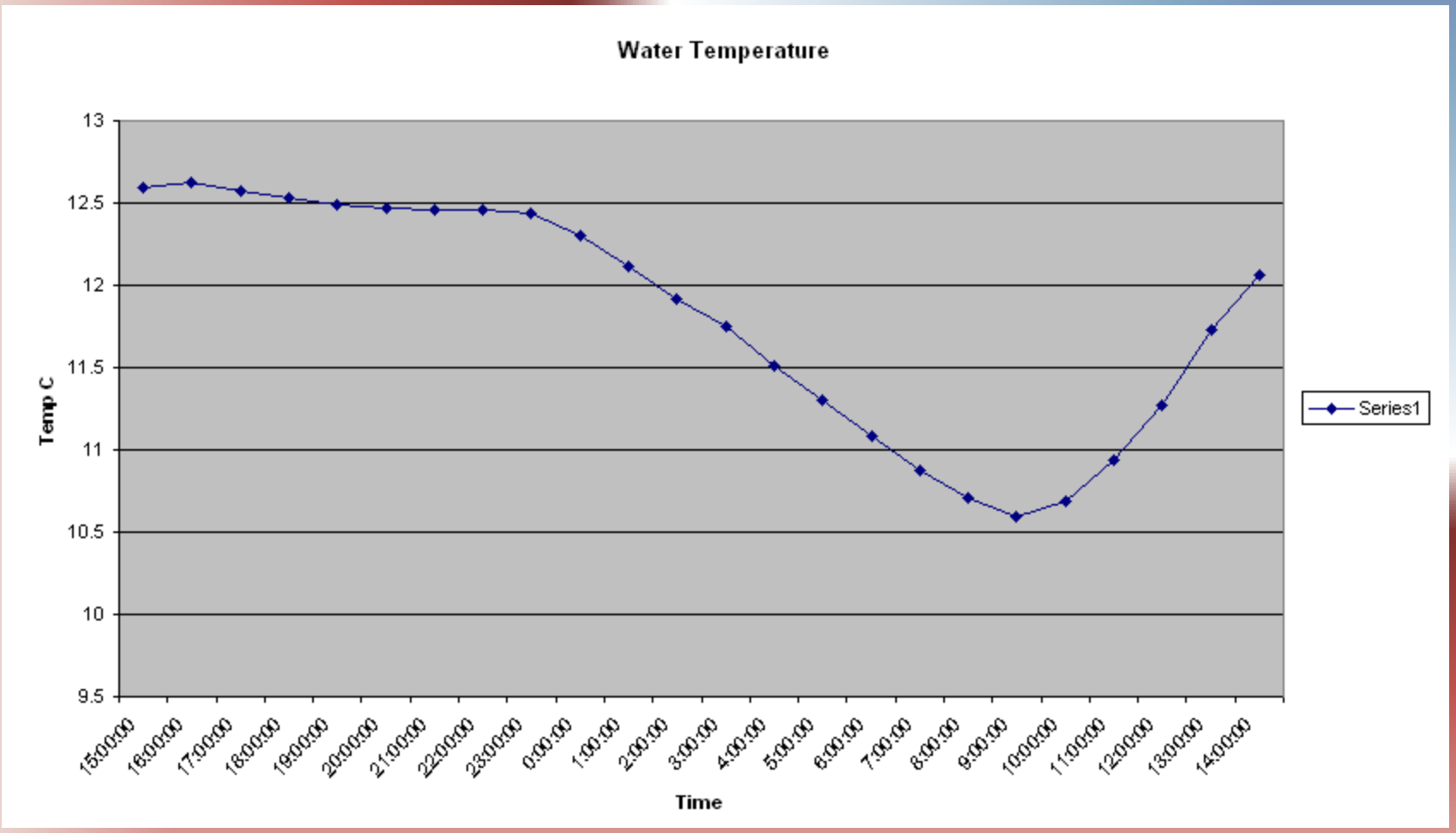
Dissolved oxygen: measures the amount of O2 in water (movement of water or plants carrying out photosynthesis).

Loads of SRP & N-NO3



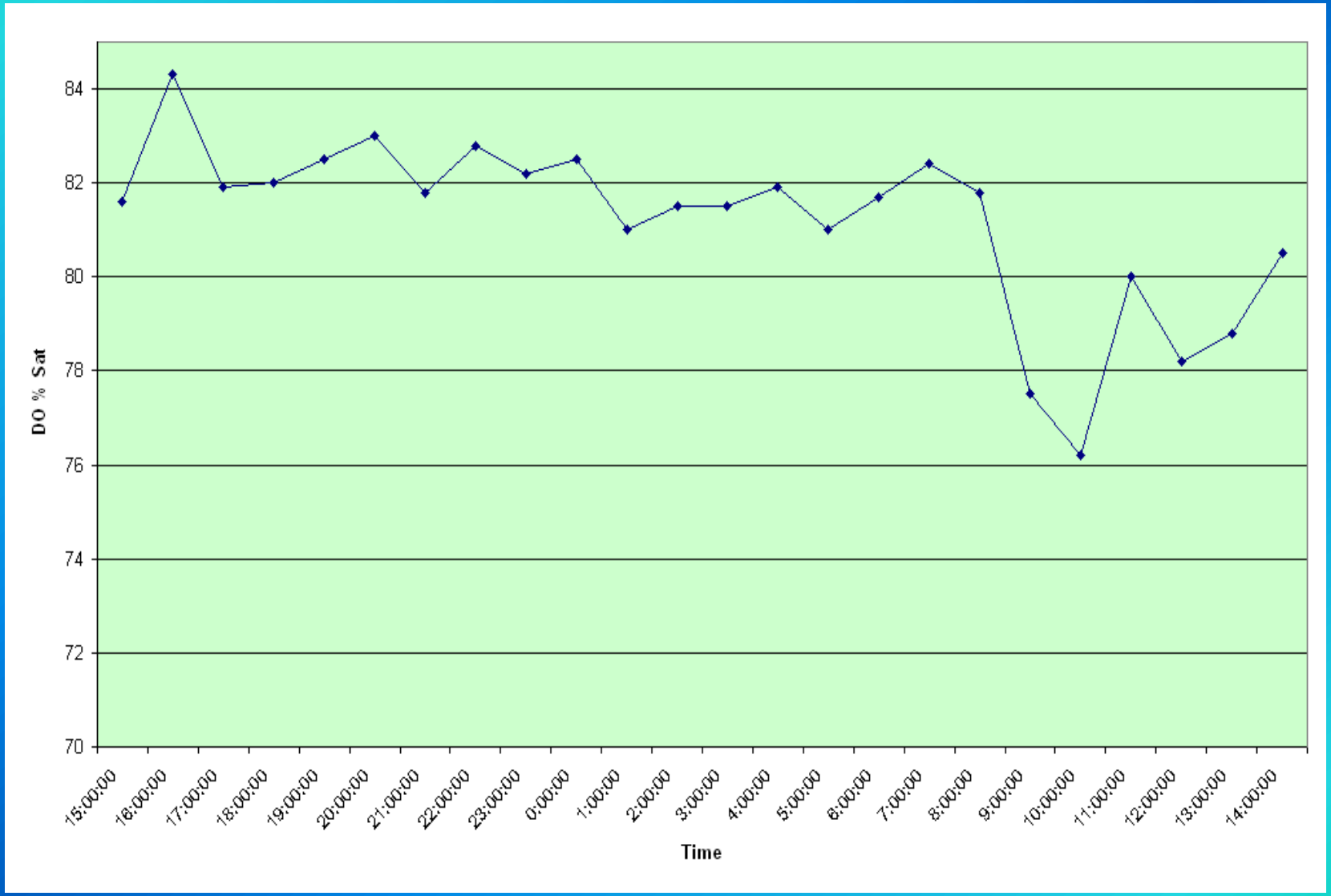
High levels of nitrogen were detected. The ratio of phosphate to nitrogen suggests that phosphate is the limiting factor.

Water Temperature



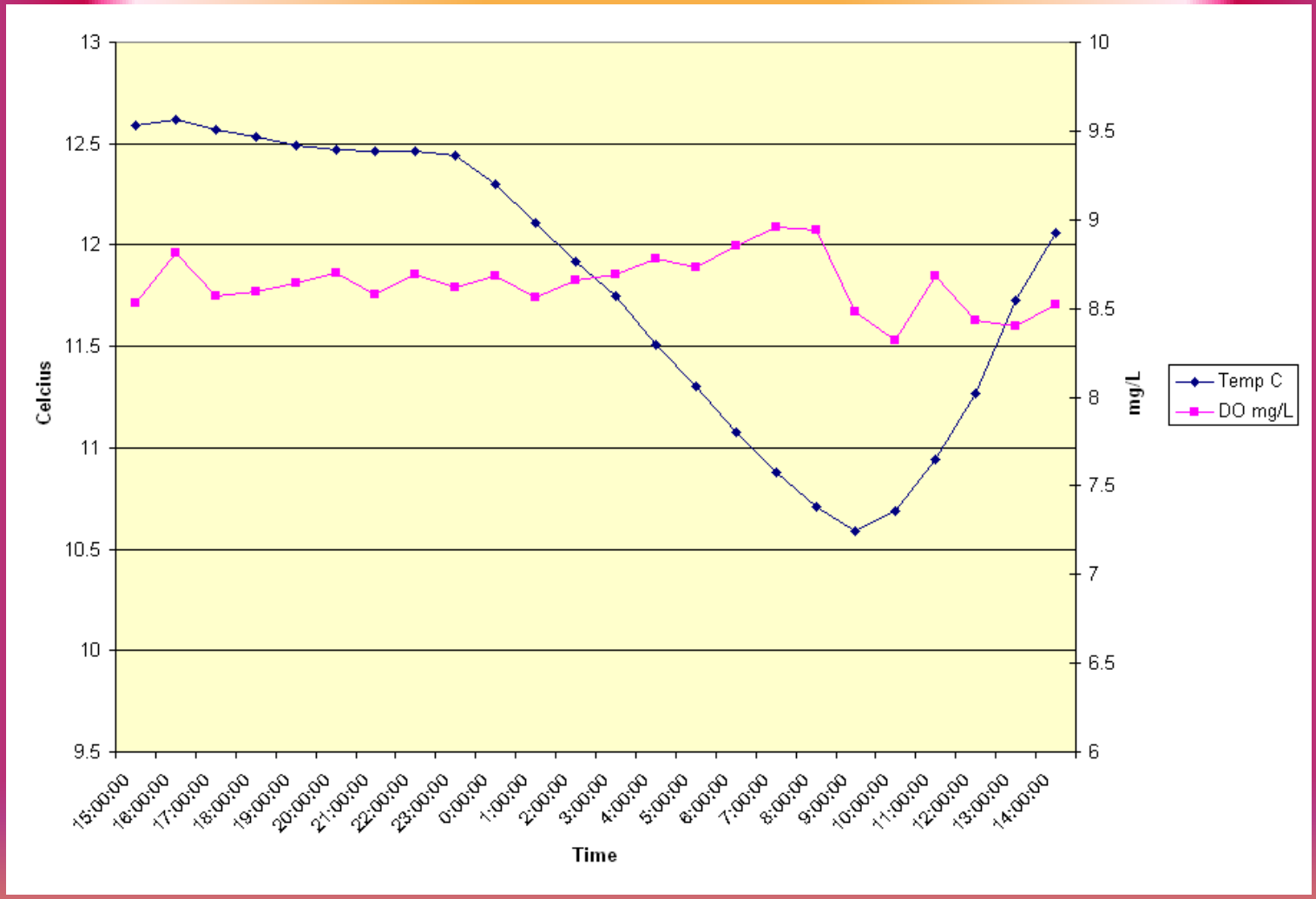
MA standards state that temperature should not exceed 28.3 C

Dissolved oxygen % Saturation



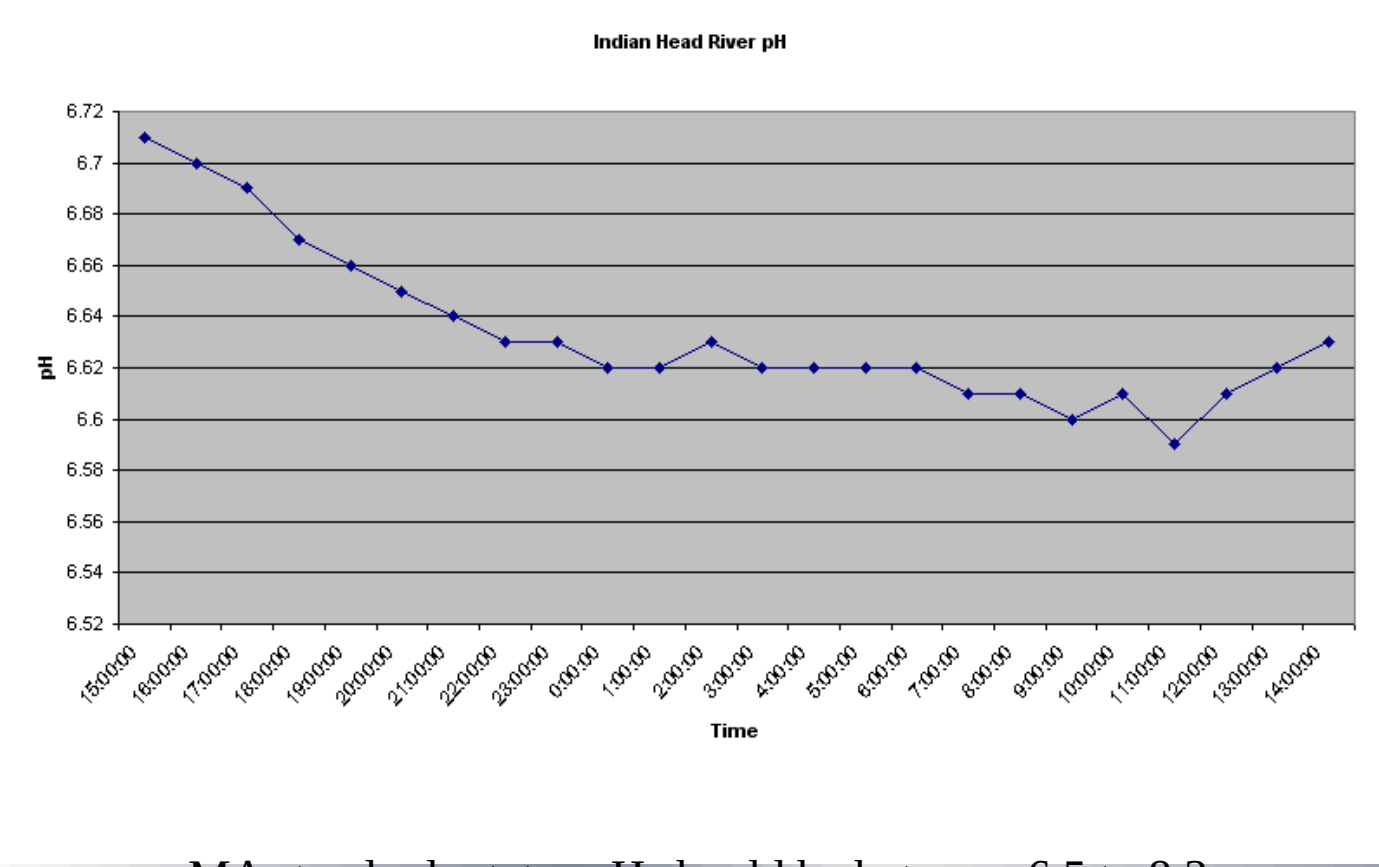
MA state standards dissolved oxygen should be 60% or higher

Dissolved Oxygen vs. Temperature



MA standards states dissolved oxygen should be 5.mg/l or higher.

pH Levels over Time



MA standards states pH should be between 6.5 to 8.3.

Conclusion

- Nitrogen levels at the site are high.
- This could be do to a sewer treatment plant up stream in Rockland.
- Cranberry bogs located in the Hanson area, located up stream.
- Local golf courses.
- Dead organic materials.

Plans For the Area

- Residential Construction
- Road Development
- Impacts:
  - Erosion
  - Nutrients
  - Wildlife
  - Habitat
  - Riparian Zone
  - Increased water usage

Science clubs Future plans

- Return late spring for invertebrate collection
- Investigate effects of home and road development
- Observe change in the riparian zone during and after construction

Special Thanks!

To

Kim McCoy, BSC water shed lab manager